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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/597,161	06/20/2000	Ichiro Okabe	025311/0105	5143
22428	7590	05/18/2005	EXAMINER	
FOLEY AND LARDNER SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			DIAZ, JOSE R	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EK

Office Action Summary	Application No. 09/597,161	Applicant(s) OKABE ET AL.	
	Examiner José R. Díaz	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,6,8 and 9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,8 and 9 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 5-6 and 8-9 are still rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. (US Pat. No. 6,156,485) in view of Cheung et al. (EP 0 840 361 A2).

Regarding claims 1, 5, 8 and 9, Tang et al. teaches a method of forming a fine pattern, comprising the steps of:

forming a silicon-oxide-based film (140) on an underlying layer (120), wherein the silicon-oxide-based film is formed by using SiH₄ and N₂O as material gases at a reaction temperature of over 450 °C (See figure 3A and col. 6, lines 20-28);

forming a chemically-amplified photoresist (150) (see figure 3A);

transferring a mask pattern onto the chemically-amplified photoresist layer (150) upon exposure through a mask (consider the patterned photoresist layer shown in figure 3A and described in col. 2, ll. 8-18 and col. 6, ll. 29-32).; and

etching the underlying layer by way of a resist pattern (150), to thereby form a fine pattern in the underlying layer (120) (see figure 3D).

However, Tang et al. fails to teach the limitation of controlling the amount of nitrogen in the silicon-oxide-based film to about a value of 0.01-0.08 atm%. Cheung et al. teaches that it is well known in the art to reduce the nitrogen content in the silicon-oxide-based film such that little or none of the nitrogen is incorporated into the silicon-oxide-based film (col. 5, lines 13-17, col. 15, lines 36-37; col. 16, lines 14-16; col. 19, lines 48-50; and col. 20, lines 17-23).

Tang et al. and Cheung et al. are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to reduce the nitrogen content in the silicon-oxide-based film to about a value of 0.01-0.08 atm%. The motivation for doing so, as is taught by Cheung et al., is to produce a fine pattern by reducing footing experienced in a subsequently applied photoresist (col. 5, lines 6-10). Therefore, it would have been obvious to combine Cheung et al. with Tang et al. to obtain the invention of claims 1, 5-6 and 8-9.

Regarding claim 6, Tang et al. teaches forming the silicon-oxide-based by means of a PECVD (see col. 6, ll. 20-21).

Allowable Subject Matter

4. Claim 3 is still objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach, disclose, or suggest, either alone or in combination, a further step of exposing the silicon oxide based film to a plasma atmosphere of O₂ or N₂O.

Response to Arguments

5. Applicant's arguments filed March 4, 2005 have been fully considered but they are not persuasive. Applicant argues that the reference fails to teach a chemically-amplified photoresist layer since Tang exposes the photoresist to a longer wavelength light. However, the examiner disagrees. It is noted that the court has held that during patent examination, the pending claims must be given their broadest reasonable interpretation consistent with the specification. *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). In the instance case, the examiner considers the term "chemically-amplified" as merely a label that does not patentably distinguish the claimed photoresist layer from the one taught by Tang. Further, one of ordinary skill in the art would recognize that a photoresist layer or resist undergoes chemical changes if it is exposed to energetic particles¹. As noted by applicant in his remarks (p. 5), Tang

¹ Streetman et al., Solid State Electronic Devices, Prentice Hall, 5th ed., 2000. page 152.

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exposes the photoresist to energetic particles during the exposure to light such as UV. Thus, the photoresist of Tang is also a "chemically-amplified" photoresist since the photoresist inherently undergoes chemical changes during the exposure to the UV light. As such, the rejection is considered to be proper

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence


Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (571) 272-1727. The examiner can normally be reached on Monday through Thursday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRD
5/13/05


GEORGE ECKERT
PRIMARY EXAMINER